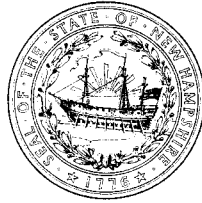


**ATTORNEY GENERAL
DEPARTMENT OF JUSTICE**

33 CAPITOL STREET
CONCORD, NEW HAMPSHIRE 03301-6397

KELLY A. AYOTTE
ATTORNEY GENERAL



ORVILLE B. "BUD" FITCH II
DEPUTY ATTORNEY GENERAL

January 5, 2009

Thomas S. Burack, Chairman
Site Evaluation Committee
New Hampshire Department of Environmental Services
29 Hazen Drive
Concord, New Hampshire 03301

NH DEPT OF
ENVIRONMENTAL SERVICES

JAN - 5 2009

RECEIVED

Re: Application of Granite Reliable Power, LLC
Docket No. 2008-04

Dear Chairman Burack:

Enclosed for filing with the New Hampshire Site Evaluation Committee with reference to the above-captioned matter please find the following:

- Testimony of Dr. George M. Mariani on Behalf of the Counsel for the Public;
- Testimony of Trevor Lloyd-Evans on Behalf of Counsel for the Public and
- Testimony of Dr. Gary R. Sanford on Behalf of Counsel for the Public

Thank you for your attention to this matter.

Very truly yours,

A handwritten signature in cursive script that reads "Peter C.L. Roth".

Peter C.L. Roth
Senior Assistant Attorney General
Environmental Protection Bureau
(603) 271-3679

/cmc
Enclosures

JAN -5 2009

RE: APPLICATION OF GRANITE RELIABLE POWER, LLC FOR
CERTIFICATE OF SITE AND FACILITY FOR GRANITE RELIABLE POWER
WINDPARK IN COOS COUNTY

RECEIVED

TESTIMONY OF TREVOR LLOYD-EVANS ON BEHALF OF COUNSEL FOR
THE PUBLIC

DECEMBER 2008

I Trevor Lloyd-Evans do hereby state under the pains and penalties of
perjury that the following attached testimony is true,

Trevor L. Lloyd-Evans

Trevor Lloyd-Evans

1

2 **Qualifications – Trevor Lloyd-Evans**

3 **Please state your name and business address.**

4 Trevor L. Lloyd-Evans. Manomet Center for Conservation Sciences, PO
5 Box 1770, Manomet, Massachusetts 02345-1770.

6

7 **Who is your current employer and what position do you hold?**

8 I am currently employed by Manomet Center for Conservation Sciences
9 (MCCS) as Senior Staff Biologist and have held this position since 1972. My
10 specialties are conservation biology, evolution and avian ecology. At various
11 times I have taught these topics both informally to staff and interns, also as
12 courses for credit to undergraduate and graduate students for a consortium of
13 colleges and universities. (Faculty, Field Biology Training Program MCCS 1986-
14 1997).

15

16 **What is your background and qualifications?**

17 Honours Zoology B.Sc. 1968 from the University of Wales (United
18 Kingdom) and graduate coursework, qualifying exams and oral exams in Ecology
19 at Boston University, Massachusetts. North American (Bird) Banding Council,
20 Committee, Trainer (1998-present). Nuttall Ornithological Club, Cambridge, MA,
21 Council, Vice-President, President (1977-1984). Committee member Partners in
22 Flight NE Region (US), Partners in Flight (Commonwealth of Massachusetts),
23 Massachusetts Avian Records Committee, member and Chair (1996-2003).

1 I have headed the Bird Migration Banding Program at Manomet Bird
2 Observatory (MCSS) since 1972 and conducted fieldwork for impact studies,
3 State and Federally funded surveys, contract and in house research in avian
4 conservation biology, ecology, physiology and evolutionary biology in US States
5 and several foreign countries. Refereed publications in professional journals,
6 presentations and contract reports are available on request.

7 For the last five years I have researched and presented a website for my
8 employer (MCCS) which summarizes available data on worldwide large scale
9 windfarm projects with an emphasis on Nantucket Sound, Massachusetts.

10 I have camped, hiked and worked professionally in many of the New
11 England and Canadian Maritime mountain regions, and am personally familiar
12 with the high altitude forest habitat in the Dixville Peak region of New Hampshire.

13
14 **Purpose of Testimony**

15 I was subcontracted by Sanford Environmental Services Inc. of 30
16 Turnpike Rd., Southborough to review all testimony relevant to birds and flying
17 mammals and to consult knowledgeable individuals and the literature regarding
18 the environmental impacts of the above project. This testimony is provided for
19 the use by the Counsel For The Public.

20 The purpose of this testimony is to present the State of New Hampshire
21 with a summary review of the reports, testimony and literature available to date
22 which address the potential impacts to birds and flying mammals from the
23 Granite Reliable Windpark in Coos County, New Hampshire. I provide a review

1 of the techniques used and the opinions and results expressed to date; also
2 recommendations for priorities and mitigation requirements for several scenarios
3 resulting from a decision to build this windpark facility.

4
5 **Q. What materials and individuals were consulted prior to this revue?**

6 The link <http://www.nhsec.state.nh.us/2008-04/index.htm> provided an up-
7 to-date reference to the project. All documents relating to birds and bats in terms
8 of habitat, breeding, migration, impact mitigation and general ecology were
9 reviewed. The relevant links and references provided within these documents
10 were also consulted, particularly including written comments provided by the New
11 Hampshire Fish and Game Department.

12 A telephone conversation with Kent McFarland, Senior Biologist at the
13 Vermont Center for Ecostudies, was particularly useful in light of their years of
14 research on the effects of ski area and wind park development. I also discussed
15 the project in a number of telephone conversations with Dr. George Mariani who
16 is the principal environmental scientist for this project for Sanford Environmental
17 Services Inc. of Southborough, MA. **APPENDIX A** lists relevant avian studies in
18 spruce/fir montane habitats in New England, New York and the Canadian
19 Maritime Provinces.

20
21 **Q. Were the key field studies appropriate and were they conducted by**
22 **qualified personnel?**

Migrating Birds and Bats:

Nocturnal bird migration radar studies, diurnal migrating raptor studies and bat echolocation studies were performed by qualified personnel from Stantec Consulting (formerly Woodlot Alternatives Inc.), 30 Park Drive, Topsham, ME. The methods used radar and echolocation hardware. Radar was used for 4 nights in fall 2006, 30 nights in spring from 26 April to 01 June 2007, and 48 nights from 05 September to 22 October in fall 2007. Four bat echolocators were run from 26 April to 01 June 2007 for a total of 467 detector nights. Finally diurnally migrating raptors were counted for 11 days at Owlhead Mtn. The very limited diurnal raptor counts are not sufficient to allow any conclusions on the timing, species composition, yearly variation or relative abundance of these birds at any point along the proposed development on the ridges.

Breeding Birds:

Breeding bird surveys were conducted by staff of the New Hampshire Audubon Society under the direction of Dr. Carol Foss, who is a noted authority on high elevation avian biology. The methods followed standard protocols for this habitat and resulted in transects with 219 10-minute counts in 50m radius circles along the areas of the proposed turbine strings and transmission lines. They were conducted from 31 May to 05 July 2007. Broadcast surveys were also conducted for two New Hampshire Special Concern species Bicknell's

1 Thrush, Rusty Blackbird), and one Threatened Species (American Three-toed
2 Woodpecker). Data on Bicknell's Thrush at Dixville Peak from a similar survey in
3 both 2005 and 2007, following the same methods, were provided as a
4 supplement. Because this method uses counts from randomly spaced circles of
5 50m radius, and because few or no circles were placed in what now seems the
6 most likely proposed region for major construction laydown and permanent
7 development on Dixville Peak, the number of protected bird territories this activity
8 would permanently displace must be regarded as currently unknown.

9 In addition to the Bicknell's Thrush and American Three-toed Woodpecker, the
10 New Hampshire Audubon Breeding Bird Study (Foss et al. 2007) detected 23
11 species currently identified by the North American Landbird Conservation Plan as
12 priorities for this region of New Hampshire. This plan represents the best efforts
13 by Federal, State, university and non-government organizations to determine the
14 bird species typical of the various United States habitats, and chosen for special
15 protection and conservation research efforts. The presence of so many species
16 in the study area emphasizes the importance of this habitat to New Hampshire's
17 citizens.

18
19
20 **Q. What are the potential effects on Migrating Birds and Bats?**

1 Of all the nocturnal migrant birds detected by radar, circa 15% were flying
2 below the maximum turbine height of 125m during spring and fall of 2007. The
3 11 days of diurnal raptor counts at Owlhead Mtn. detected 44 birds of which 55%
4 were below maximum turbine height. More study is recommended to determine
5 the use of the whole ridge system by migrating diurnal raptors before any
6 impacts can be confidently predicted.

7 A total of 467 bat detector nights counted 291 bat echos, a rate of 0.6
8 echos per detector per night. There is no evidence of the presence of any state
9 or federally protected bat species and none have been recorded nearby to my
10 knowledge. Many of the detections were not at the species level and the number
11 of individuals involved is unclear.

13 **What are the potential effects on Breeding Birds?**

14 The high elevation spruce/fir habitat is unique and restricted to only the
15 highest mountain regions of New England. I return to data on Bicknell's Thrush
16 because of its protected status and because the volume of research available on
17 this species makes it the best representative of the above habitat. I strongly
18 support the findings of the New Hampshire Fish and Game Department that
19 "45% of the potential habitat for this species in the world is found in New
20 Hampshire". Any reduction of this habitat will clearly affect the breeding bird
21 assemblage negatively. The reports summarize the losses due to initial

1 construction, habitat replacement after construction and permanent habitat loss.
2 For example, the Third set of data requests is answered by the estimate that
3 “Construction of roads and turbine pads is projected to eliminate 23.0 acres of
4 high elevation spruce/fir habitat on Dixville Peak. This translates to the
5 equivalent of four female Bicknell's Thrush home ranges”. Bicknell's Thrush is
6 chosen because of its Special Concern status in New Hampshire and the legal
7 requirements this entails. However, the whole suite of high elevation breeding
8 species is involved in the permanent habitat loss. By contrast with the trail and
9 human usage on Dixville Peak, the Kelsey Mtn. area of proposed wind turbines
10 and associated roads and transmission lines is one of the most pristine and
11 unfragmented blocks of this unique habitat remaining in New England, and is
12 barely visited by human activities. Clearly, as a worst case scenario, the loss
13 should be kept to a minimum, perhaps on Dixville Peak, and follow the guidelines
14 from McFarland et al. 2008 in a report to Vermont Fish and Wildlife Department
15 Nongame and Natural Heritage Program, pp. 56-58.

16 The transects of point counts by New Hampshire Audubon staff are not
17 sensitive to the large breeding and foraging areas used by breeding or wintering
18 raptorial birds. I was unable to determine the presence or use by these species
19 from the data presented.

20
21 **Q. What mitigation would best protect breeding bird habitat in this**
22 **montane forest environment?**

Removal of proposed turbines to a lower elevation, below the montane forest spruce/fir zone on at least the southern Kelsey Mountain area would greatly reduce the impact on the most sensitive area. The timing of construction to avoid the bird breeding season is extremely important. The above research indicates that a moratorium on construction activity in the montane spruce/fir forest zone should extend from 1 April to 1 August in order to minimize avian impacts to this ecoregion. This would avoid the crucial breeding season activities of most birds in the high montane avifauna. For exact details of timing for various species of concern in the various areas, New Hampshire Fish and Game and New Hampshire Audubon Society possess the required local knowledge, or can provide it in the future.

Replacement of all restored high elevation habitat disturbed during construction would increase the rate of recovery of the habitat to desirable levels. Grass seed is not appropriate in this habitat. Restoration would involve planting of native species wherever possible. These techniques are best described by Rimmer et al. (2004), *qui vide*. The seven points are briefly summarized as :

- Timing disturbance to avoid breeding activities when birds are most vulnerable.
- Co-locate new wind farm development with existing developments on high peaks.
- Telescopic turbine tower construction to reduce habitat removal around the bases.

- 1 • Allow any temporarily cleared areas to revegetate after construction.
- 2 • At Bicknell's Thrush breeding locations, best practices should be
- 3 employed in an adaptive management plan.
- 4 • Any(t) cutting should be infrequent, and maintain certain parameters (see
- 5 full paper for details).
- 6 • Timing of vegetation management should be delayed in summer until 1
- 7 August to avoid impacting the breeding season for 95% of Bicknell's
- 8 Thrushes.

9

10 **Q. What is the noise effect of the proposed turbines on Breeding Birds?**

11 I can find no relevant studies. The effect appears to be unknown, and is

12 addressed in the reports.

13

14 **SUMMARY:**

15 The most significant impact of this project from the perspective of avian

16 populations is the proposed removal of any montane spruce/fir habitat. The best

17 practice would be to site the wind towers, roads and power lines below this

18 habitat.

19

**APPENDIX A: PUBLICATIONS FROM THE VERMONT CENTER FOR
ECOSTUDIES RELEVANT TO HIGH ALTITUDE MONTANE FOREST FAUNA**

A discussion with Senior Biologist Kent McFarland of the Vermont Center for Ecostudies provided access to the following publications (see originals at <http://www.vtecostudies.org/Papers.html>) :

Lambert, J.D., D.I. King, J.P. Buonaccorsi and L.S. Prout. 2008. Decline of a New Hampshire Bicknell's Thrush Population, 1993-2003. Northeastern Naturalist 15: 607-618.

Frey, S.J.K., C.C. Rimmer, K.P. McFarland, and S. Menu. 2008. Identification and sex determination of Bicknell's Thrushes using Morphometric Data. J. of Field Ornithology 79: 408-420.

Hallworth, M., P. M. Benham, J. D. Lambert and L. Reitsma. 2008. Canada warbler (*Wilsonia canadensis*) breeding ecology in young forest stands compared to a red maple (*Acer rubrum*) swamp. Forest Ecology and Management 255: 1353-1358.

Hallworth, M., A. Ueland, E. Anderson, J. D. Lambert, L. Reitsma. 2008. Habitat Selection and Site Fidelity of Canada Warblers (*Wilsonia canadensis*) in Central New Hampshire. Auk 125(4): 880-888.

Rodenhouse, N.L., S.N. Matthews, K.P. McFarland, J.D. Lambert, L.R. Iverson, A. Prasad, T.S. Sillett, and R.T. Holmes. 2008. Potential effects of climate

1 change on birds of the Northeast. Mitigation and Adaptation Strategies for Global

2 Change 13: 517-540.

3 King, D., J.D. Lambert, J. P. Buonaccorsi, and L. S. Prout. 2007. Avian

4 population trends in the vulnerable montane forests of the Northern

5 Appalachians, USA. Biodiversity and Conservation 17: 2691-2700.

6 Townsend, J.M.and C.C. Rimmer. 2006. Known natal and wintering sites of a

7 Bicknell's Thrush. Journal of Field Ornithology 77: 452-454.

8 Lambert, J. D., K. P. McFarland, C. C. Rimmer, S. D. Faccio, and J. L. Atwood.

9 2005. A practical model of Bicknell's Thrush distribution in the northeastern

10 United States. Wilson Bulletin 117:1-11.

11 Rimmer, C.C., K. P. McFarland, D. C. Evers, E. K. Miller, Y. Aubry, D. Busby,

12 and R. J. Taylor. 2005. Mercury levels in Bicknell's thrush and other insectivorous

13 passerine birds in montane forests of the northeastern United States and

14 Canada. Ecotoxicology 14:223-240.

15 Strong, A.M., C.C. Rimmer, and K.P. McFarland. 2004. Effect of prey biomass on

16 reproductive success and mating strategy of Bicknell's Thrush (Catharus

17 bicknelli), a polygynandrous songbird. Auk 121:446-451.

18 Rimmer, C.C., J. Almonte M., E. Garrido G., D.A. Mejia, M. Milagros P., and P.R.

19 Wieczorek. 2003. Bird records in a montane forest fragment of western Sierra

20 de Neiba, Dominican Republic. Journal of Caribbean Ornithology 16:55-60.

- 1 Faccio, S.D. 2003. Effects of ice storm-created gaps on forest breeding bird
2 communities in Central Vermont. *Forest Ecology and Management* 186:133-145.
3 [\[Abstract\]](#) [\[Full Document \(.pdf 383 kb\)\]](#)
- 4 Goetz, J.E., K. P. McFarland and C.C. Rimmer. 2003. Multiple paternity and
5 multiple male feeders in Bicknell's Thrush (*Catharus bicknelli*). *Auk* 120: 1044-
6 1053.
- 7 Strong, A. M., C. C. Rimmer, K.P. McFarland and K. Hagan. 2002. Effects of
8 mountain resorts on wildlife. *Vermont Law Review* 26(3): 689-716.
- 9 Rimmer, C.C. and K.P. McFarland. 2001. Known breeding and wintering sites of
10 Bicknell's Thrush. *Wilson Bull.* 113: 234-236.
- 11 Rimmer, C.C., K.P. McFarland, W.G. Ellison, J.E. Goetz and H. Ouellet. 2001.
12 Bicknell's Thrush (*Catharus bicknelli*). In *The Birds of North America*, (A. Poole
13 and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, and The
14 American Ornithologists' Union, Washington, D.C.
- 15 Hobson, K.A., K.P. McFarland, L.I. Wassenaar, C.C. Rimmer and J.E. Goetz.
16 2001. Linking breeding and wintering grounds of Bicknell's Thrushes using stable
17 isotope analyses of feathers. *Auk* 118:16-23.
- 18 Lowther, P.E., C.C. Rimmer, B. Kessel, S.L. Johnson, and W.G. Ellison. 2001.
19 Gray-cheeked Thrush (*Catharus minimus*). In *The Birds of North America*, No.
20 591. (A. Poole & F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

- 1 Rimmer, C.C. and K.P. McFarland. 2000. Post breeding dispersal and migration
2 stop-over in a montane spruce-fir forest in northern Vermont. Wilson Bull.
3 112:124-136.
- 4 Rimmer, C.C. and K.P. McFarland. 1999. Sky Island Songbirds. Natural History
5 9:35-39.
- 6 Rimmer, C.C. and K.P. McFarland. 1999. Sky Island Songbirds. Natural History
7 9:35-39.
- 8 Rimmer, C.C., K.P. McFarland, and J.E. Goetz. 1999. Distribution, habitat use,
9 and conservation status of Bicknell's Thrush in the Dominican Republic. El Pitirre
10 12: 114.
- 11 Hochachka, W.M., T.E. Martin, and 28 other authors including K.P. McFarland in
12 alphabetical order. 1999. Scale dependence in the effects of forest coverage on
13 parasitization by brown-headed cowbirds. Studies in Avian Biology 18: 80-88.
- 14 Faccio, S.D., C.C. Rimmer and K.P. McFarland. 1999. Results of the Vermont
15 Forest Bird Monitoring Program, 1989-1996. Northeastern Naturalist 5: 293-312.
- 16 Rimmer, C.C., J.E. Goetz and K.P. McFarland. 1998. Bird Observations in
17 threatened forest fragments of the Sierra de Neiba. El Pitirre 11(2):15-17.
- 18 Rimmer, C.C. and K.P. McFarland. 1998. Tennessee Warbler (*Vermivora*
19 *peregrina*). In The Birds of North America, (A. Poole and F. Gill, eds.). The

- 1 Academy of Natural Sciences, Philadelphia, and The American Ornithologists'
- 2 Union, Washington, D.C.
- 3 Rimmer, C.C., J.L. Atwood, K.P. McFarland, and L.R. Nagy. 1995. Population
- 4 density, vocal behavior and recommended survey methods for Bicknell's Thrush.
- 5 Wilson Bull. 108:639-649.
- 6 Atwood, J.L., C.C. Rimmer, K.P. McFarland, S.H. Tsai, and L.R. Nagy. 1995.
- 7 Distribution of Bicknell's Thrush in New England and New York. Wilson Bull. 108:
- 8 650-661.

Page 1 of 11

THE STATE OF NEW HAMPSHIRE
BEFORE THE
NEW HAMPSHIRE
SITE EVALUATION COMMITTEE

NH DEPT OF
ENVIRONMENTAL SERVICES

JAN - 5 2009

RECEIVED

DOCKET NO.2008-04

RE: APPLICATION OF GRANITE RELIABLE POWER, LLC
FOR CERTIFICATE OF SITE AND FACILITY
FOR GRANITE RELIABLE POWER WINDPARK
IN COOS COUNTY

TESTIMONY OF DR. GEORGE M. MARIANI ON BEHALF OF THE COUNSEL FOR
THE PUBLIC

DECEMBER 2008

I, George M. Mariani, Ph.D., do hereby state under the pains and penalties of
perjury that the following attached testimony is true.

A handwritten signature in black ink, appearing to read 'G. Mariani', is written over a horizontal line.

George M. Mariani, Ph.D.

Qualifications

Please state your name and business address.

George Mariani: Sanford Environmental Services, Inc. 30 Turnpike Road
Southborough, Massachusetts 01772.

Who is your current employer and what position do you hold?

I am the President and Principal of Sanford Environmental Services, Inc. (SES), an environmental consulting firm located in Southborough, Massachusetts. As an environmental consultant, I provide consulting services and perform field work and analyses to evaluate proposed projects in relation to applicable local, state and federal environmental regulatory programs. I have performed wetland functional analyses, stormwater management analyses, wetland resource identification and mapping including boundary delineations, river evaluations, wildlife habitat assessments, wetland, wildlife and water quality impact assessments, and wetland, wildlife and water quality evaluations. I have provided consulting services to numerous private owners and project proponents, municipalities, state agencies, the U.S. Army Corps of Engineers and the Department of the Interior.

What is your background and qualifications?

I received a Bachelor of Science degree in Biology from Boston College in 1972, a M. S. degree in Plant and Soil from the University of Massachusetts in 1975 , and Ph.D. in Environmental Sciences from the University of Texas at Dallas in 1979. I was employed by E.G.&G Environmental Consultants in February 1979 and worked on

various energy related and waste disposal projects until 1983. In 1984, I co-founded Sanford Ecological Services, Inc., which is now called Sanford Environmental Services, Inc. (SES). SES is an environmental consulting firm which conducts investigations designed to identify natural resources, identify potential impacts and resolve potential impacts.

TESTIMONY OF GEORGE M. MARIANI

Purpose of Testimony:

The purpose of this testimony is to present my review and evaluation of the impacts of the proposed Granite Reliable Power Project (GRP Project) in Coos County, New Hampshire on water quality, and wetland and wildlife habitat of the region.

I am familiar with the GRP Project. I have reviewed the application and project plans submitted by GRP. In addition, I have reviewed certain of the letters, testimony, and supplementary information contained in Docket No.2008-04, including the following materials:

1. Application of Granite Reliable Power, LLC for Certificate of Site and Facility - Granite Reliable Power Windpark - Coos County, New Hampshire - July 2008;
2. Volume 4 - Appendix 2 - N.H. Wetlands Bureau - Standard Dredge & Fill Application;
3. Volume 5 - Appendix 3 - Alteration of Terrain Application;
4. Appendix 4 - Request for 401 Water Quality Certification;
5. Appendix 15 - October 12, 2007 letter to Pip Decker from Adam Gravel of Stantec Consulting - Subject: Reconnaissance-Level Rare Plant Survey at the Proposed Windpark, Coos County, New Hampshire;

6. Appendix 16 - Natural Community Characterization - Granite Reliable Power's proposed Wind Power project in Coos County, New Hampshire - May 2008 prepared by Stantec Consulting
7. Appendix 17 - July 20, 2008 letter to Pip Decker from Adam Gravel of Stantec Consulting - Subject: Rare Plant Survey in response to NH Natural Heritage Bureau Review at the Proposed Windpark in Coos County, New Hampshire;
8. Appendix 18 - August 17, 2007 letter to Pip Decker from Charles Ferris of Woodlot Alternatives, Inc. - Subject: Reconnaissance-Level Wetland and Vernal Pool Survey;
9. Appendix 25 - 2007 Winter Track Survey at the Proposed Windpark in Coos County, New Hampshire - prepared by Stantec Consulting;
10. Appendix 40 - Granite Reliable Power High Elevation Avoidance and Mitigation Plan;
11. Supplement to the Application - October 23, 2008;
12. 2005 Master's Thesis by Jillian Kelly - Recent Distribution and Population Characteristics of American Marten in New Hampshire and Potential Factors Affecting Their Occurrence;
13. A set of 138 sheets of plans prepared by Horizons Engineering depicting existing and proposed conditions in pdf format provided by Joshua Brown of Noble Environmental Power;
14. A spreadsheet in pdf format of wetland impacts provided by Joshua Brown of Noble Environmental Power (I attach this file to my testimony since it contains information I have not seen elsewhere in the filings).

- 1 15. November 12, 2008 letter to the Site Evaluation Committee from Melissa
2 Coppola of the New Hampshire Natural Heritage Bureau - Subject:
3 Progress Report: Site Evaluation committee No. 2008-004 - Application of
4 Granite Reliable Power, LLC;
5 16. DES Alteration of Terrain Status Report - November 12, 2008;
6 17. DES Wetlands Bureau Status Report - November 12, 2008;
7 18. DES Watershed Status Report - November 10, 2008;
8 19. Adam Gravel and Steve Pelletier Pre-filed Testimony;
9 20. Philip Beaulieu Pre-filed Testimony;
10 21. NH Fish and Game comments on GRP application - August 6, 2008; and
11 22. NH Fish and Game Progress Report - November 13, 2008.

12 I was also given a motorized tour of the Project site on December 11, 2008 by
13 Josh Brown of GRP.

14
15 What is your understanding of the extent of the proposed GRP Windpark?

16 As described by the applicant, the proposed GRP Windpark (The Project) calls
17 for the placement of 33 - 3.0 megawatt wind turbines placed along the ridgelines of
18 Dixville Peak (elevation 3482 feet), Mount Kelsey (elevation 3468 feet), Owlhead
19 Mountain (elevation 2867 feet) and Fishbrook Ridge (elevation 2582 feet), upgrading 19
20 miles of existing roadways, construction of 12 miles of new roadways, construction of a
21 switching station, construction of a substation/staging area, construction of two storage
22 areas and the construction of overhead and underground power transmission lines.

23 Since the filing of the initial application, the proposed impacts as a result of land
24 disturbance have increased 46 percent from 202.87 acres (see Section C, Table A of

Application) to 297.09 acres (see GRP response to TS 2-10). Similarly, impacts to wetlands (including impacts to 7 vernal pools) have increased 15.6 percent from 12.8 acres (see Standard Dredge and Fill Application, dated July 7, 2008), to 13.4 acres (see supplement to Section H of SEC application - Summary of Wetlands Impact Table, dated October 23, 2008), and then to 14.8 acres (see Wetlands Bureau Dredge Fill Application - Summary of Wetland Impacts submitted to SES by Josh Brown, dated October 2008). In addition, approximately 58 acres of direct impact to High Elevation Habitat is being proposed (see Granite Reliable Power High Elevation Avoidance and Mitigation Plan, dated October 9, 2008). The increases in total land disturbance and wetland impacts over the past several months and the approximation of the direct impact to High Elevation Habitat suggests that the project design is still evolving.

The applicant is proposing a mitigation package which includes: (1) a conservation easement on a 660 acre parcel located in the Phillips Brook headwaters, (2) a 350 acre high elevation mitigation area (>2700 feet) that is made up of conservation easements on 500-foot areas around Project facilities located on Owlhead and Mt. Kelsey ridge tops and a 200 foot buffer around the new access road leading up to the ridge from the existing road, and (3) creation of several vernal pools within the Phillips Brook parcel and the proposed high elevation mitigation area.

Has the applicant provided an alternatives analysis that demonstrates that the preferred alternative has the least amount of impacts to the natural environment?

The applicant provides an alternatives analysis that evaluates a smaller project size and a no-build alternative. The applicant states that the project initially was to consist of 67 - 1.5MW turbines constructed on both the western and eastern ridges.

1 Because the wind resource studies on the eastern ridges showed that the wind resource
2 would support a turbine rated up to 3.0MW, the applicant removed turbine strings that
3 were proposed for the western ridgelines of the Phillips Brook watershed in order to
4 consolidate the Project components exclusively along the eastern ridges of the Phillips
5 Brook Tract. As stated by the applicant: "additional benefits of the present design
6 include: a larger distance of separation from the Nash Stream Forest, significant
7 reduction in length of roads and collection line, and eliminating the need to cross the
8 Phillips Brook watershed multiple times with collection lines and proposed access roads.
9 The final design reduces the amount of area disturbed while maintaining the project
10 viability."

11 While all these benefits may be true, the applicant has not demonstrated that the
12 final design has less environmental impact than a scaled down project or a project that
13 utilizes turbines at locations that are less environmentally sensitive. The application
14 does not evaluate a project that utilizes a mix of turbine technologies at different
15 locations to reduce impacts to wetlands and wildlife habitat. The loss of critical high
16 elevation habitat and potential impacts to State and Federal threatened high elevation
17 species (eg. American marten, Bicknells Thrush, American three-toed woodpecker)
18 require that the applicant conduct a more thorough alternatives analysis that avoids loss
19 of high elevation habitat. It appears that the design was driven primarily by wind
20 resources and secondarily by avoidance and minimization of wetland impacts, with little
21 attention paid to impacts on important wildlife habitat.

22

23

24

1 **Does the Project provide adequate protection of water quality?**

2 The Project will have a potential impact on surface water quality during the
3 construction. The applicant has proposed various best management practices (BMPs)
4 to address this issue. In order to insure that these practices are implemented, an
5 independent Environmental Monitor (EM) should be retained by the applicant to conduct
6 weekly inspections of all sediment and erosion control measures. The EM should verify
7 the placement and performance of erosion control measures and should have the
8 authority to halt construction for erosion control purposes or for threats to the
9 environment. The EM should submit weekly reports to the project engineer and the
10 Department of Environmental Services (DES) during active construction. These reports
11 should summarize the status of construction, the condition of the site and should report
12 any erosion, sedimentation or pollution problems and how they were corrected, along
13 with recommendations on how to prevent similar problems in the future. The EM should
14 immediately report any erosion, sedimentation or pollution problems to the project
15 engineer, who will be responsible for taking immediate steps to correct those problems.

16 The proposed BMPs do not include the use of haybale and filter fence to trap
17 sediments in work areas that are in the vicinity of wetland and water resources. SES
18 recommends that haybale and filter fences be installed in all areas where construction
19 occurs within 100 feet of a stream, pond or wetland. Due to the critical nature of these
20 resources, a robust water quality monitoring program should be implemented to
21 determine the effectiveness of the water quality mitigation plan. The Project should also
22 initiate a comprehensive baseline survey should be initiated in 2009 prior to the start of
23 construction and continue for a period of three years following the end of construction.
24 Water samples should be collected downstream at the site of each proposed stream

and wetland crossing for turbidity analysis. During construction, water samples should be collected during rainfall events that are predicted to be greater than 0.5" in intensity. The results of the turbidity analysis should be reported to the Environmental Monitor within 24 hours of their collection. Any increase(s) in turbidity over pre-construction levels will require the Environmental Monitor to notify the project engineer so that additional mitigation measures are implemented to reduce turbidity. Water quality sampling should continue for a period of three years after the completion of all construction activities to ensure that the BMPs employed are effective in controlling erosion and sedimentation.

Will the proposed mitigation package compensate for lost wetland and wildlife habitat:

The proposed mitigation plan includes a conservation easement on a 660 - acre parcel located in the Phillips Brook headwaters, creation of several vernal pools within the Phillips Brook parcel, a conservation easement on 500 foot areas around Project facilities located on Owlhead and Mt. Kelsey ridge tops and a 200 - foot buffer around the new access road leading up to the ridge from the existing road. While the proposed conservation easements appear to offer some protection of existing resources from potential future development (if any), they should not be considered as replacement for the impacts to wetlands and wildlife habitat associated with the current project.

The proposed wetland mitigation package includes the protection of a 660 acre site located in the Phillips Brook watershed. Outside of proposing replication for seven (7) vernal pools that will be impacted, the applicant is not proposing any creation or restoration of wetland habitat. Thus, the project will result in the net loss of 14.66 acres of wetland.

1 The project will impact seven (7) existing vernal pools, for which the Applicant
2 proposes to mitigate by creating several vernal pools within the 660 - acre Phillips Brook
3 conservation easement area. The Applicant proposes to locate the vernal pools
4 adjacent to existing old logging roads or trails. Since vernal pools are temporary bodies
5 of water that provide critical habitat for many vertebrate and invertebrate species and
6 they provide essential breeding habitat as well as wildlife habitat functions during non-
7 breeding season for a variety of amphibian species (e.g. Wood Frog and Spotted
8 Salamander), SES recommends that a criteria for the placement of the proposed vernal
9 pools be that they are located adjacent to an existing vegetated wetland. In addition,
10 SES recommends that the proposed monitoring programs be conducted by a certified
11 wildlife biologist to ensure that the observations made during the monitoring program
12 can be evaluated to determine the success of the vernal pool creations and the need to
13 make any modifications to the vernal pool habitat(s). SES also recommends that the
14 monitoring programs include: (1) monitoring of water levels within the pool on a weekly
15 basis from early spring through summer, (2) weekly chorusing efforts conducted from
16 late March to early May to identify breeding amphibians and (3) a minimum of three pool
17 surveys to evaluate the pools for the presence of egg masses, spermatophores, and
18 adult organisms. Audio records of the chorusing and photographs of all observed egg
19 masses and organisms should be made during the field investigations. The results of
20 these monitoring programs should be submitted to DES within 60 days of the completion
21 of fieldwork. The results of these monitoring programs will serve as a basis to evaluate
22 the success of the vernal pool creations and the need to make any changes to the
23 design.

1 Although the proposed high elevation mitigation plan will provide a conservation
2 easement and create a buffer zone around the access road, the exemption for
3 construction, operation and maintenance within these areas should be considered as a
4 significant permanent impact to High Elevation Habitat. As described by the project's
5 representative at the December 19, 2008 technical session: the proposed restoration
6 plan for construction impacts within the high elevation areas consists of planting a native
7 grass seed mix in order to stabilize the soils in the 200-foot diameter cleared area
8 around each turbine pad, as well as in the areas of cut and fill where rip-rap is not
9 needed. This planting plan does not replace the habitat characteristics (eg. Shrub
10 cover, tree cover, woody cover, snags) that are important to wildlife within these high
11 elevation areas. The complex character of the high elevation forested habitat takes
12 decades to form, and makes these areas important to the wildlife species that need
13 them for their life cycles. The proposed planting plan should not be considered a
14 restoration of wildlife habitat characteristics within these high elevation areas; especially
15 since these areas will be used for the construction, operation and continual maintenance
16 of the project. Thus, the proposed loss of 58 acres of High Elevation Habitat should be
17 considered a permanent impact that is not mitigated. In order to compensate for or
18 avoid the loss of this valuable resource, the applicant should investigate the feasibility of
19 restoring other degraded High Elevation Habitat within the northern New Hampshire
20 area and/or relocate turbine strings outside of these high elevation areas so as to
21 achieve a no net loss of High Elevation Habitat.

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Page 1 of 14

THE STATE OF NEW HAMPSHIRE
BEFORE THE
NEW HAMPSHIRE
SITE EVALUATION COMMITTEE

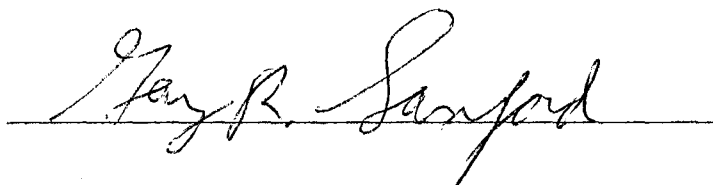
DOCKET NO.2008-04

RE: APPLICATION OF GRANITE RELIABLE POWER, LLC
FOR CERTIFICATE OF SITE AND FACILITY
FOR GRANITE RELIABLE POWER WINDPARK
IN COOS COUNTY

TESTIMONY OF DR. GARY R. SANFORD ON BEHALF OF COUNSEL FOR THE
PUBLIC

DECEMBER 2008

I, Gary R. Sanford, Ph.D., do hereby state under the pains and penalties of
perjury that the following attached testimony is true.

 Gary R. Sanford, Ph.D.

1 **Qualifications**

2 **Please state your name and business address.**

3 Gary R. Sanford, Ph.D. c/o Sanford Environmental Services, 30 Turnpike Road,
4 Southborough, MA. 01772.

6 **Who is your current employer and what position do you hold?**

7 I am semi-retired and work on only selected projects. I am currently retained by
8 Dr. George Mariani of Sanford Environmental Services for the purpose of reviewing the
9 Granite Reliable Power Windpark application. Prior to my semi-retirement in November
10 of 2007 I was co-principal with Dr. George Mariani of Sanford Ecological Services, Inc.
11 My review responsibilities for this project cover wetland and wildlife habitat issues.

13 **What is your background and qualifications?**

14 Prior to my semi-retirement I was the President and a Principal of Sanford
15 Ecological Services, Inc., an environmental consulting firm located in Southborough,
16 Massachusetts, which I founded and managed since 1983. As an environmental
17 consultant, I provided consulting services and performed field work and analyses to
18 evaluate site resources and proposed projects in relation to the Massachusetts
19 Wetlands Protection Act (the "Act") and other local, state, and federal environmental
20 regulatory programs. I have experience in both marine and inland ecosystem
21 evaluations. I have performed wetland functional analyses, stormwater management
22 analyses, wetland resource identification and mapping including boundary delineations,
23 river evaluations, wildlife habitat assessments, and wetland and floodplain impact
24 assessments. I have experience in developing project mitigation via resource

1 replacement, and project planning and design specifications to meet the performance
2 standards under the Massachusetts Wetlands Protection Act and the Army Corps of
3 Engineer's 404 program.

4 In my capacity as a wetland scientist, I have worked within Massachusetts, New
5 Hampshire, and Maine as well as outside the New England area. I have worked for
6 cities and towns (Waltham, Easton, Bellingham, Lexington, Hamilton, Franklin and
7 others), the Army Corps of Engineers, the Department of the Interior, the Department of
8 Justice, and a large number of companies and private citizens. I have been qualified as
9 an expert witness in a number of DEP adjudicatory proceedings, in Land Court, Superior
10 Court, and in U.S. District Court.

11 I received a B.A. degree in Botany from the University of California, Berkeley, an
12 M.A. degree in Biological Sciences from Chico State College, California, and a Ph.D. in
13 Botany with an emphasis in ecology from the University of California, Davis. I have
14 worked for more than twenty-five years in the initiation, development and management
15 of environmental programs. My experience includes college level teaching, program
16 management, ecological research, regulatory constraint analysis, site evaluations,
17 environmental impact assessment, report preparation, permitting, wildlife analysis, and
18 provision of expert testimony in adjudicatory and court proceedings.

19 I performed post graduate, doctoral and postdoctoral research on the ecology of
20 streams and rivers. My doctoral research dealt with the ecology of high altitude Sierra
21 Nevada streams. I have also provided consulting services related to wetland impacts
22 associated with the Hoosic Wind Project located in Florida, Massachusetts.

I have prepared and presented to Conservation Commissions and the Massachusetts Department of Environmental Protection formal filings pursuant to the Massachusetts Wetlands Protection Act, including Determinations of Applicability, Requests for Orders of Resource Area Delineation, Notices of Intent, and Requests for Superseding Determinations or Orders, for several hundred sites and/or proposed projects.

1. I was appointed to the Massachusetts Department of Environmental Quality Engineering (predecessor to the Department of Environmental Protection) Scientific Subcommittee for the purpose of advising and aiding the Department in developing the Department's current wetland wildlife habitat protection regulations. I am certified by the United States Fish and Wildlife Service in "Habitat Evaluation Procedures". I have served on a Department technical advisory committee in developing regulatory modifications for the delineation of Bordering Vegetated Wetlands.

Purpose of Testimony:

Q. What is the purpose of your testimony?

The purpose of this testimony is to present my review and evaluation of wetland and wildlife habitat impacts associated with this project. In preparing this testimony I have reviewed the following materials:

1. Application of Granite Reliable Power, LLC for Certificate of Site and Facility - Granite Reliable Power Windpark - Coos County, New Hampshire - July 2008;
2. Volume 4 - Appendix 2 - N.H. Wetlands Bureau - Standard Dredge & Fill Application;
3. Volume 5 - Appendix 3 - Alteration of Terrain Application;

- 1 4. Appendix 4 - Request for 401 Water Quality Certification;'
- 2 5. Appendix 15 - October 12, 2007 letter to Pip Decker from Adam Gravel of Stantec
- 3 Consulting - Subject: Reconnaissance-Level Rare Plant Survey at the Proposed
- 4 Windpark, Coos County, New Hampshire;
- 5 6. Appendix 16 - Natural Community Characterization - Granite Reliable Power's
- 6 proposed Wind Power project in Coos County, New Hampshire - May 2008
- 7 prepared by Stantec Consulting
- 8 7. Appendix 17 - July 20, 2008 letter to Pip Decker from Adam Gravel of Stantec
- 9 Consulting - Subject: Rare Plant Survey in response to NH Natural Heritage
- 10 Bureau Review at the Proposed Windpark in Coos County, New Hampshire;
- 11 8. Appendix 18 - August 17, 2007 letter to Pip Decker from Charles Ferris of
- 12 Woodlot Alternatives, Inc. - Subject: Reconnaissance-Level Wetland and Vernal
- 13 Pool Survey;
- 14 9. Appendix 25 - 2007 Winter Track Survey at the Proposed Windpark in Coos
- 15 County, New Hampshire - prepared by Stantec Consulting;
- 16 10. Appendix 40 - Granite Reliable Power High Elevation Avoidance and Mitigation
- 17 Plan;
- 18 11. Supplement to the Application - October 23, 2008;
- 19 12. 2005 Master's Thesis by Jullian Kelly - Recent Distribution and Population
- 20 Characteristics of American Marten in New Hampshire and Potential Factors
- 21 Affecting Their Occurrence;
- 22 13. A set of 138 sheets of plans prepared by Horizons Engineering depicting existing
- 23 and proposed conditions in pdf format provided by Joshua Brown of Noble
- 24 Environmental Power;

1 14. A spreadsheet in pdf format of wetland impacts provided by Joshua Brown of
2 Noble Environmental Power (I attach this file to my testimony since it contains
3 information I have not seen elsewhere in the filings).

4 15. November 12, 2008 letter to the Site Evaluation Committee from Melissa Coppola
5 of the New Hampshire Natural Heritage Bureau - Subject: Progress Report: Site
6 Evaluation committee No. 2008-004 - Application of Granite Reliable Power, LLC;

7 16. DES Alteration of Terrain Status Report - November 12, 2008;

8 17. DES Wetlands Bureau Status Report - November 12, 2008;

9 18. DES Watershed Status Report - November 10, 2008;

10 19. Adam Gravel and Steve Pelletier Pre-filed Testimony;

11 20. Philip Beaulieu Pre-filed Testimony;

12 21. NH Fish and Game comments on GRP application - August 6, 2008; and

13 22. NH Fish and Game Progress Report - November 13, 2008.

14 Although I have inspected the general area of the proposed project by car, my
15 comments are based upon a review of the above documents.

16
17 **Q. How are wetland impacts normally evaluated?**

18 There are three basic considerations when reviewing project related wetland
19 impacts. These are whether or not the project has (1) avoided wetland impacts
20 whenever possible, (2) minimized wetland impacts, and (3) mitigated for wetland
21 impacts. Beyond these basic considerations, local, state, and federal regulatory
22 agencies may have specific threshold requirements and performance standards. The
23 Department of Environmental Services is in the processes of evaluating the project for

1 compliance with New Hampshire regulations while the Army Corps of Engineers is
2 reviewing the project under its 404 program.

3
4 **Q. Has the project design avoided wetland impacts whenever possible?**

5 No. Whenever possible, the project design makes use of existing roads and
6 logging access routes. This is a sound strategy since wetland impacts associated with
7 access over the existing logging road network avoids impacts that new road alignments
8 would generate. This strategy can not be 100% effective since there are engineering
9 constraints that place conditions upon the roads that logging activities do not need to
10 meet. For example, project design calls for different minimum width, curve radius, and
11 grade than presently exists within the logging road network. As a result, portions of the
12 existing roads will need to be widened and re-graded and some turns will have to be re-
13 aligned. These proposed road improvements mean that in some cases project design
14 does not avoid wetland impacts.

15 Obviously a no-build alternative avoids all wetland impacts from a project. A no-
16 build alternative is only chosen if the project can not meet applicable performance
17 standards (ex: NH Code of Adm. Rules Part Env-Wt 302 Criteria for Evaluation) or the
18 impacts outweigh the projected benefits from the project (ex: 33 CFR Part 320.4(a)).
19 Usually, access impacts are dealt with slightly differently from impacts associated with
20 the proposed facility itself. There is a general recognition of the need to gain access to
21 useable upland and hence the avoidance criterion is more strenuously applied to the
22 facility rather than the access. With this in mind, I examined the location of the turbines
23 themselves. Eleven of the twelve graded turbine pads along the Fishbrook ridge are
24 located in uplands.

Of the fourteen turbine pads proposed for the Owl Head/ Kelsey string, six of them will impact wetlands as shown in Table 1. These impacts include not only the pads but occasionally some adjacent proposed road work.

Table 1. Wetland impacts associated with Turbine Pads on the Owl Head/ Kelsey ridge.

<i>IMPACT ID</i>	<i>102-1</i>	<i>105-7</i>	<i>105-11</i>	<i>106-4</i>	<i>106-9</i>	<i>107-2</i>	<i>TOTAL</i>
<i>SQ. FT.</i>	<i>11,324</i>	<i>6,936</i>	<i>8,162</i>	<i>3,371</i>	<i>20,043</i>	<i>5,545</i>	<i>55,381</i>

These impacted areas represent 27% of all wetlands above 2700 feet on the Owl Head/ Kelsey ridge. (I have chosen to concentrate on impacts above 2700 feet because of the importance of high altitude wildlife habitat.) The project engineer should devise methods to avoid or reduce these impacts.

Of the seven turbine pads associated with the Dixville string, five of them impact wetlands as shown in Table 2. These impacts include not only the pads but occasionally some adjacent proposed road work.

Table 2. Wetland impacts associated with Turbine Pads on the Dixville ridge.

<i>IMPACT ID</i>	<i>123-5</i>	<i>125-2</i>	<i>127-4</i>	<i>129-5</i>	<i>129-6</i>	<i>129-7</i>	<i>131-5</i>	<i>131-6</i>	<i>TOTAL</i>
<i>SQ. FT.</i>	<i>6,325</i>	<i>7,279</i>	<i>606</i>	<i>1,735</i>	<i>1,261</i>	<i>2,883</i>	<i>8,653</i>	<i>469</i>	<i>29,211</i>

These impacted areas represent 22% of all wetlands above 2700 feet on the Dixville ridge. The project engineer should examine methods to avoid or reduce these impacts.

1 **Q. Has the project design minimized wetland impacts whenever possible?**

2 No. There are measures that can be utilized to reduce wetland impacts such as
3 re-configurations and steeper slopes in selected locations. There is also a strong
4 likelihood that significant additional secondary impacts to wetlands may occur because
5 of potential alterations to wetland hydrology.

6 Both surface and subsurface hydrology must be considered in order to avoid or
7 minimize secondary impacts to wetlands outside the construction footprint. The goal is
8 to minimize increases or decreases in water reaching these wetlands. A great deal of
9 material has been presented in the application dealing with hydrological issues.

10 Analyses were done to size culverts and ditches and it is clear from the plans that
11 culverts were placed in strategic locations to maintain surface water flows. Appendix 3
12 of the Application states:

13 While new access roads are proposed a design approach has been selected to
14 influence the existing hydraulic and hydrologic conditions as little as possible.
15 This is contrary to typical projects where flow is concentrated, diverted,
16 attenuated and treated. The proposed design approach is based on preventing
17 the generation of runoff with erosive potential and treating the runoff as close to
18 the source as possible in the event that erosion does occur, while maintaining the
19 existing diffuse drainage patterns. In order to accomplish this, the approach
20 includes:

- 21 1. Applying a suitable roadway base as well as surface material (bankrun
22 and crushed gravel), that can support heavy equipment and transport
23 vehicles, prevent compaction of sub-base materials, and provide a durable
24 travel surface that resists rutting during and after construction.
- 25 2. Providing short distances between proposed culverts beneath the access
26 roads, to ensure that storm water and shallow groundwater will encounter
27 minimal diversion and channelization by the roadside ditches. The
28 frequent culvert spacing will also minimize the amount of storm water
29 concentrated in any one channel, allowing for a better ability to maintain
30 the existing drainage patterns.

31
32 Despite the attention the project design pays to managing stormwater runoff, I have
33 serious concerns about potential wetland impacts along the new access roads and

1 turbine pads. For example, the new access road to Owl Head/ Kelsey ridge will cause
2 impact 99-2 (1,306 sq. ft.). More than half of this impact is a result of the construction of
3 the road side ditch and adjacent cut side slope. The proposed road side ditch will be
4 located approximately six feet below the existing wetland grade. The up-gradient
5 wetland is likely to become drier because subsurface flows will bleed out of the cut
6 surface into the ditch. This water would then be carried down the ditch to a culvert
7 where it will pass as surface flow under the road and by-pass Potential Vernal Pool #25.
8 It is likely therefore that secondary impacts will result to the up-gradient wetland by
9 drying a portion of the wetland and to the down gradient Potential Vernal Pool #25 by
10 altering vernal pool hydrology. Vernal pool hydrology is critical for the successful
11 reproduction of spotted salamanders that have been documented present in this pool.
12 This is but one example of many where additional secondary impacts to wetlands may
13 occur, and are not minimized or addressed by the project design. A couple of other
14 examples are impacts 104-1 and 105-3.

15 A second concern I have is related to blasting. Other than the potential need for
16 blasting, no information is presented as to where blasting might occur. Blasting is of
17 concern because it may open bed rock fractures that can alter the water balance of
18 wetlands and hence cause secondary impacts. This could be of special concern to
19 nearby vernal pools. A hydrogeological evaluation of the nearby wetlands is required to
20 assess the potential for this type of impact and should be conducted for each instance
21 where blasting is proposed.

22

23

1 Q. Has the project design provided adequate mitigation for all unavoidable wetland
2 impacts?

3 No. Proposed mitigation includes the protection of a 660 acre site (Phillips Brook
4 Mitigation Area) located within the Town of Columbia and unincorporated Ervings
5 Location. The site buffers Phillips Brook on the east and the Nash Stream State Forest
6 on the west. Appendix 2 provides information on this proposed conservation area that
7 indicates the presence of wetlands with similar functional capacity to the proposed
8 impacted wetland areas.

9 Also vernal pool creation has been proposed to offset project impacts to existing
10 vernal pools. The project asserts that unspecified new vernal pools would be located
11 and designed sometime in 2009. While it is feasible to create vernal pools, detailed
12 design work is required to insure their success. Locating new vernal pools in high
13 altitude locations will displace existing upland wildlife habitat.

14 Both the DES and the Army Corps of Engineers are evaluating the project and its
15 proposed mitigation package. New Hampshire allows buffer zone protection as a
16 potential mitigation strategy. On April 10, 2008 the Corps and EPA published a final rule
17 on compensatory mitigation for losses of aquatic resources. This rule allows the use of
18 preservation as a mitigation tool but generally also requires restoration or enhancement.
19 The Federal Register (Vol. 73, No. 70/ Thursday, April 10, 2008 - page 19635) states:
20 "As stated in §332.3(h)(2) [§230.93(h)(2)], preservation will be provided in conjunction
21 with aquatic resource restoration, establishment, and/or enhancement activities, unless
22 the district engineer waives this requirement in a situation where preservation has been
23 identified as a high priority using a watershed approach." If the Corps requires

1 additional mitigation in the form of creation or restoration then additional landscape
2 impacts may result.

3 Whether or not preservation is considered adequate mitigation by the agencies, it
4 is clear that without wetland creation or restoration there will be a net loss of both
5 wetlands and wetland functions. The amount of direct wetland loss is about 14.8 acres.
6 Assuming proper design and siting, some wetland creation will occur when vernal pools
7 are constructed. The project proposes some restoration by replacing existing culverts in
8 perennial streams with open bottom culverts and stream channel restoration. These
9 proposals do not provide adequate functional mitigation for wetland losses. Appendix 2
10 indicates that the project site offers restoration opportunity on-site. For example, the
11 restoration of wetlands located in logging yards. I recommend that both wetland
12 creation and restoration be utilized to offset the wetland functions lost by proposed
13 impacts.

14
15 **Q. What wetland functions and values will the proposed project design destroy?**

16 A wetland functional analysis has been completed and included in Appendix 2 of
17 the application. A total of 14 wetland functions or values were assessed. The
18 assessment places the wetlands into three groups based upon elevation, slope, and
19 existing and proposed land use. As stated in Appendix 2: "Group 1 - Includes wetlands
20 in lower reaches of the project from Route 16 along the Dummer Pond Road corridor
21 with northern hardwood and low-land spruce-fir forest with a corridor length over 14
22 miles." ... "Group 2 - Includes wetlands along the 3 access road corridors for each of the
23 turbine strings- Fishbrook, Kelsey/Owlhead, and Dixville Peaks- and the transmission
24 line." ... "Group 3 - Includes wetlands along the 3 strings of the turbines Fishbrook,

Kelsey/Owlhead, and Dixville Peaks and are generally located in a high-elevation spruce-fir forest system.”

These groupings are coarse and the results would not apply to every individual wetland within each group. With this caveat in mind the results of the analysis suggest that project wetlands are important for the support of fish habitat and for providing wildlife habitat.

Both Groups 1 and 2 wetlands are considered important for fish habitat. Appendix 2 states: “Group 1 wetlands include Phillips Brook and tributaries including No. 3 Brook, Walkinson Brook, Wells Brook and Kelley Brook, which may support populations of brook trout. Group 2 wetlands include the West Branch Clear Stream in the Androscoggin River watershed which also may support populations of brook trout.”

Groups 1, 2 and 3 are considered important for wildlife habitat. Appendix 2 states: “All wetlands on the site have this [wildlife habitat] as an important value for a wide variety of reasons including location in a large undeveloped forest, high water quality, cover, food, etc.” Consequently, the loss of such wetlands will reduce the ability of the landscape to support wildlife populations.

Q. What considerations led to the conclusion of the presence of important wildlife habitat?

Appendix 2 lists six considerations that support this conclusion for all three Groups. These are:

- *Water quality of the watercourse, pond, or lake associated with this wetland meets or exceeds Class A or B standards.*
- *Upland surrounding this wetland is undeveloped.*
- *More than 40% of this wetland edge is bordered by upland wildlife habitat (e.g., brushland, woodland, active farmland, or idle land) at least 500 feet in width.*

- *Wildlife overland access to other wetlands is present.*
- *Wildlife food sources are within this wetland or are nearby.*
- *Animal signs observed (tracks, scats, nesting areas, etc.)*

Beyond these general considerations, the reports do not identify exactly what habitat characteristics will be lost. For example, how many snags, how much woody debris, how many and what size trees, how much shrub cover, and what other characteristics will be lost. I recommend that detailed inventories be made of each wetland impact area in order to assess loss of habitat characteristics. Such information will be essential in designing wetland creation and restoration proposals. It is clear from the tracking studies that wildlife utilization is high and includes American Martin, fisher, ermine, moose, coyote, red fox ruffed grouse, red squirrel, and snowshoe hare.

Q. Will the proposed mitigation package compensate for lost wetland habitat?

No. There will be a net loss of wetland wildlife habitat. For this reason I recommend wetland creation and restoration beyond what has been proposed.

Q. Summarize your concerns about wetlands and wildlife habitat.

1. Wetland impacts have not been avoided or minimized.
2. The amount and extent of wetland impacts have been underestimated.
3. Insufficient information has been obtained to assess secondary wetland impacts.
4. No hydrogeological analysis has been done to assess localized stormwater flow or shallow sub-surface groundwater flow diversions.

5. No blasting evaluations have been done to assess the potential for bed rock fracture impacts that may affect nearby wetlands.
6. No detailed inventory of wetland wildlife habitat characteristics present within proposed impact areas has been provided.
7. There will be a significant loss of wetlands and wetland wildlife habitat (14.8 acres).
8. The location and design of replacement vernal pools has yet to be worked out.
9. Proposed mitigation does not replace these wetlands or wetland functions.